THE OPTICAL
MAGIC LANTERN
JOURNAL
AND
PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notices.

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NOTICE.

MANY CORRESPONDENTS STILL FORWARD THEIR COMMUNICATIONS TO THE OLD ADDRESS. WILL THEY PLEASE NOTE THAT OUR ADDRESS IS NOW

56, CHANCERY LANE, LONDON, W.C.

Notes.

IN our first article in this issue—Aphengescopes—we answer a number of queries received upon this subject, consequently those correspondents will not find their questions alluded to in our "Notes and Queries" column. For the most part the subject of our articles is prompted by the readers themselves, and when we have a number of questions from different sources bearing upon the same subject, we endeavour to devote an article to it. Correspondents who do not find their name or *nom de plume* on the last page of the journal published after their query was sent, will understand that their question is either answered in an article in that issue or that it came too late for insertion.

* * *

PHOTOGRAPHIC apparatus is to be exhibited in connection with the Stanley Cycle Show at the Agricultural Hall, from 18th to 26th inst.

* * *

MR. D. W. NOAKES stated in an article in last issue that it was dangerous to look for a leak at oxygen cylinder with a light. Several correspondents, having called our attention to the statement as being curious, we asked Mr. Noakes to explain the subject. This he kindly offered at once to do, but unfortunately the copy came too late to be included in this issue.

* * *

THE partnership lately existing between Messrs. Mitchell & Stevens, of Glasgow, has been dissolved. The business will be carried on as before, by Mr. Mitchell, at 191, Hope Street, whilst Mr. Stevens (Stevens Bros.) has opened premises at 33, Osborne Street, Glasgow. The Bible set of slides advertised in our columns are now published at the latter address.

* * *

On the 15th, 16th and 17th inst., the Hackney Photographic Society will hold their annual exhibition at Morley Hall, Mare Street, N.E. The exhibition will be open each day from 4 to 10 p.m., and a good round of vocal and instrumental concerts and lantern displays is promised. The admission will be 1s.

* * *

On the opening night (3rd ult.) of the Grappenhall Young Men's Guild, Mr. Thos. Fletcher, F.C.S., showed a number of scientific experiments with the lantern, including images formed on the screen by the voice (phonoscope), opaque objects, magnetic experiments, kaleidoscopic effect, and the drawing of compound geometrical figures.

* * *

A couple of months ago we stated that Mr. S. O. Lees had retired from the managing partnership of the Gas Compression Company, Manchester. We have pleasure in stating that he has commenced business on his own account at Fairfield Street, Manchester. His advertisement will be found in another column.

* * *

Messrs. Gilmer Bros., the Birmingham representatives of Clement & Gilmer, of Paris, have hitherto been located at Victoria Buildings, Temple Row, but they have lately taken new premises in Manchester Buildings, Cannon St., Birmingham, where they have a fine display of lanterns, lenses and general optical goods.

* * *

A practical class in connection with "Lantern Slides and Lantern Work," will commence at the Polytechnic Institute, Regent Street, W., on 16th inst., and be continued each Wednesday evening for three months. As the fee for the course is only half a guinea, here is a fine opportunity for our London readers to obtain practical experience under the leadership of Mr. Chas. W. Gamble.

* * *

The coming rage in lantern slides will be "Tennyson," and already Messrs. York & Son, of Notting Hill, have issued portraits of the late Lord Tennyson and of his grave at Westminster Abbey. They also have 20 slides illustrating "Enoch Arden," 11 "Dora," and 10 "May Queen." Mr. Alfred Underhill, of Croydon, is at present engaged on a set of "Tennyson" which will include portrait, residence, "Charge of the Light Brigade," "The Brook," &c.

Aphengescopes.

In the aphengescope or opaque lantern, the images are represented upon the screen by reflection, instead of, as in the case of ordinary lantern slides—by transparency.

When employing the aphengescope, a large range of objects may be exhibited.

Rays of light are collected upon the image to be projected; this may be done in a variety of ways, but the principle in each case is the same.

Great illuminating power is required, and an ordinary optical lantern, in the simple form, can be utilized for this purpose. The nozzle of a lantern, L, Fig. 1, is inserted into the side of a box M, having five sides, provided with a lens as shown; the picture being of course placed opposite the lens. Still better illumination may be obtained by using the light from two lanterns as shown in Fig. 2.

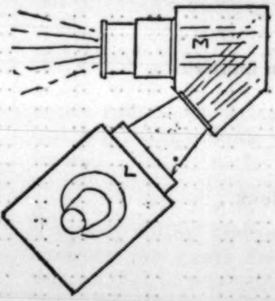

Fig. 1.

The two lanterns, L L, are turned so that they point away from the screen, and it will be observed that the box for use with two lanterns is provided with six sides. The pictures or objects are fastened to the door D; card photographs, watches, shells, coins, and a variety of subjects will readily suggest themselves.

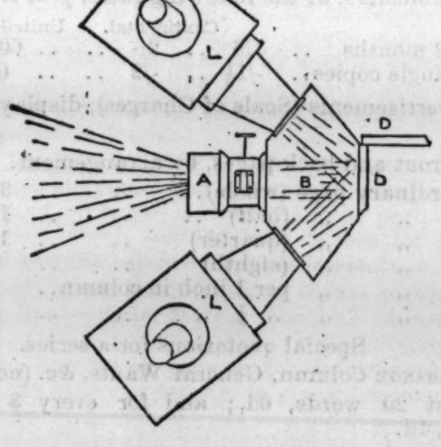

Fig. 2.

Fig. 3 represents a more recent form of Aphengescopic attachment, but the lantern with which it is intended to use it must be made much higher than an ordinary single lantern. This form, however, posseses advantages over the forms previously described, for the lantern may remain in the same position whether transparent slides or opaque objects are to be projected. When the latter are to be shown, the lens, picture and reflector must be in the position shown in the cut, and when transparencies are to be exhibited the front containing the lens, which slides in grooves, is pushed down, and the reflector lowered, the transparency can then be placed in its usual position in front of the condenser.

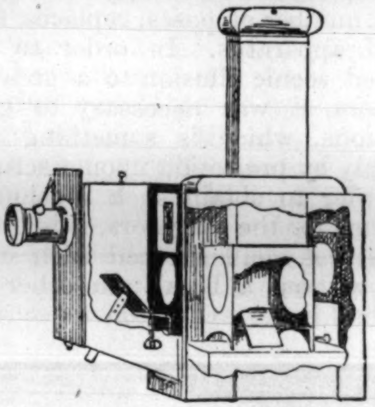

Fig. 3.

Thirteen months ago we called attention to a new style of lantern, invented by M. Trouvé, and introduced by M. Molteni, of Paris. This style of lantern he terms l'Auxanoscope.

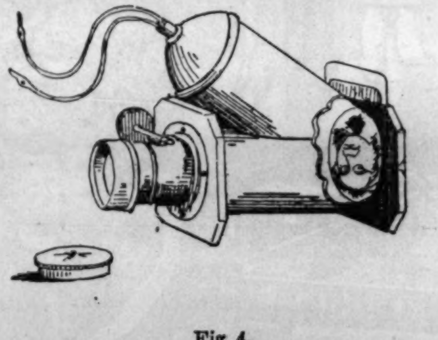

Fig. 4.

These lanterns are made in different forms, according to the purpose for which they are intended. They are all fitted with the electric incandescent light, and have been adopted by the *Ligue de l'Enseignement*, whose members use them for giving instruction in the villages. The principle in l'Auxanoscope for opaque objects, is however the same as the preceding forms. Figs. 4 & 5 show the shapes of the instrument. The incandescent light is fixed in a tube, the end of which is provided with a reflector; these are made with either one, two or three tubes and reflectors, that with the three lights being used either for opaque or transparent slides, by using the two front lights for the former, and one light placed behind for the latter.

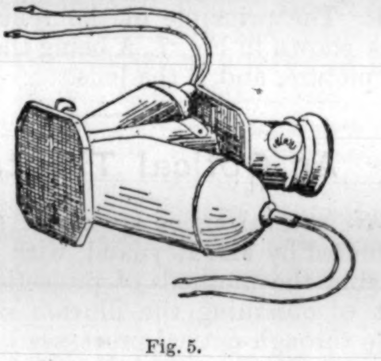

Fig. 5.

A totally different instrument for concentrating the light upon an opaque object was devised by Dr. Foote, Jun., of New York, and termed the Polyopticon Wonder Camera, Fig. 6. The

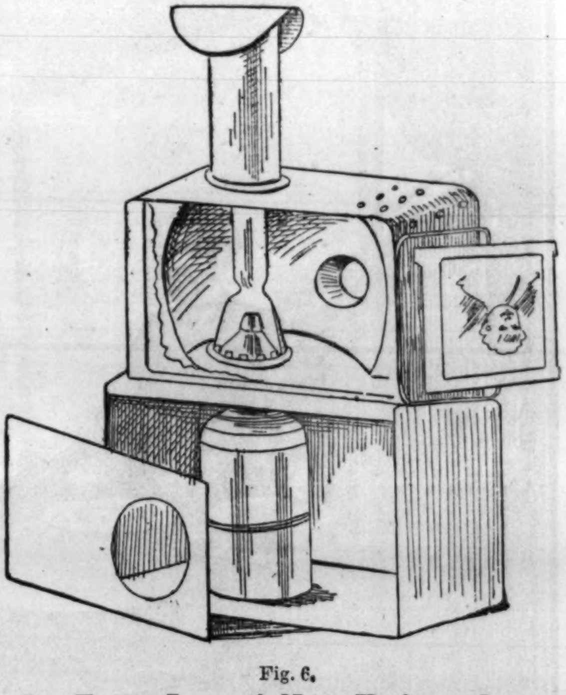

Fig. 6.

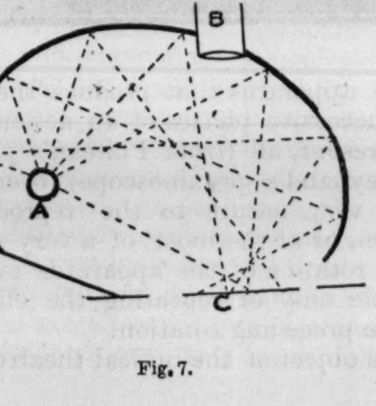

Fig. 7.

illuminant being an argand kerocene lamp, which gives an intense flame; this is situated in one focus of an elliptical reflector, and in the other focus is placed the picture, or object to be projected. The principle of the reflection of the light is shown in Fig. 7, A being the illuminant, C the picture, and B the lens.

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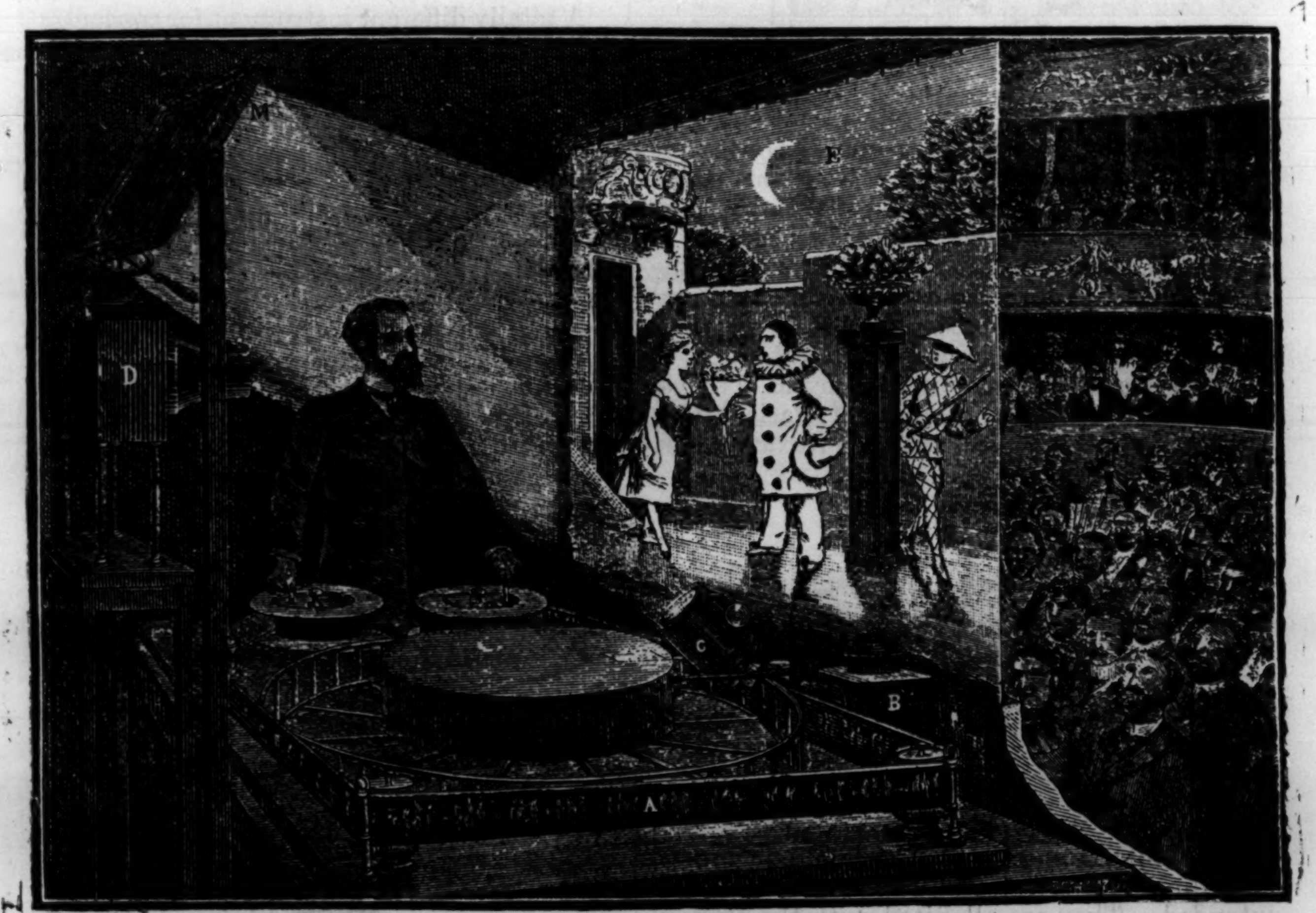
An Optical Theatre.

We have several times spoken of an apparatus constructed by Mr. Reynaud, with the object of improving the methods of projection, and thus permit of obtaining the illusion of movement and life through optical processes.



The apparatus that produce the synthesis of the successive phases of an action, have, up to the present, all (from Plateau's phenakisticope to Reynaud's praxinoscope) been limited by their very nature to the reproduction of a motion, or at the most, of a very simple action, every rotation of the apparatus evidently being capable only of repeating the effect produced by the preceding rotation.

The object of the optical theatre is to extend the illusion to the reproduction of a large series of actions, and of thus realizing the reconstruction of an entire scene through optical synthesis.

To this effect a band of great length, carrying a large number of poses, replaces the crown of the old apparatus. In order to present the animated scenic illusion to a great number of spectators, it was necessary to give it large dimensions, which is something that can be done only by projection upon a screen.

In order to obtain such illusion under good conditions for the operators, it is necessary that the postures shall succeed each other on the screen without a break; in other words, that there shall be no extinction or eclipse between two successive postures. This continuity of the image, obtained already by the praxinoscope, invented in 1877 by Mr. Reynaud, has not, up to the present, been realized by any projecting apparatus.

The optical theatre, by its very construction, realizes it in such a way, that the succession of the postures may be interrupted at every instant, without the image ceasing to be illuminated and visible upon the screen. This property permits, in the representation of the animated stage, of reposes and repetitions which, at the same time, increase the truthfulness of the effect, and the duration of the scene represented. The optical theatre thus allows spectators to witness complete scenes (pantomimes, interludes, &c.), lasting from fifteen to twenty minutes, with a number of postures and a length of band that remain within practical limits. It thus produces a spectacle both interesting and amusing. Moreover, the optical theatre seems as if it will hereafter constitute the typical apparatus for the synthesis of the photographic series of successive postures, and it is doubtless in this direction that it will in the future find its principal applications, when the improvement in instantaneous apparatus, and reduction in the cost price of photogenic films, will have permitted of easily and cheaply obtaining very numerous series of each postures.

Our illustration represents the arrangement of Mr. Reynaud's new optical theatre. The crystalloid band upon which the images are painted, is represented at *a*. The operator can revolve it in one direction or the other, by means of two handles. The images, reproduced by a special process of reproduction in colours, pass before the lantern, *b*, and are projected through the intermedium of a lens, *c*, upon an inclined mirror, *m*, which projects them upon the transparent screen, *e*. Another projection lantern, *d*, causes the appearance upon the stage of the scenery amid which appear the characters, changing postures, painted upon the band, *a*. Mr. Reynaud has got up some very amusing scenes, especially the three-character pantomime entitled, "Pauvre Pierrot."—*La Nature*.

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Our Visits.

No. 1. Chatham Pexton, See November 1891.
2. Walter Tyler, See December 1891.

No. 3. Theobald & Co.

A few days ago we called upon Messrs. Theobald & Co., at their recently acquired premises, 43, Farringdon Road, E.C., and after transacting our business, were informed that the firm turned out, what we thought was a very large number of slides per week. It was evident that Mr. Theobald thought we doubted his figures, for he said, "Just spare half an hour or so, to go over the premises, and you can see for yourself." We accepted the invitation, and commenced the round of inspection.

As we were, at the time of speaking, in the office on the first floor of the building, we decided to commence there.

Having left the office, and thus got out of reach of the eternal clicking from the typewriting that goes on in that department, our guide called our attention to some new series of slides, including Red Riding Hood, Utopia, Charge of the Light Brigade, and many others.

Mr. Theobald, pointing to a series of shelves on one side of the large room, said, "Those shelves contain between two or three million lithographic pictures for transferring to glass." Certainly the pictures were in great number, so we decided to take his word as to the number, in preference to ascertaining for ourselves. Slides of every conceivable description were present, including photos of life models, and effect slides.

The second floor is fitted, for the most part, with long benches, boxes, &c. Models, sewing machines, lanterns, slides, toys, musical instruments, and jets, were being packed by a small army of women preparatory to being sent away.

Ascending still higher, we entered the next floor, which is at the top of the building, this floor is of greater interest than either of the previous ones, for here the transferring and mounting of slides was being done by a large staff. As water plays an important part in this department, many of the tables were provided with a gutter immediately below the edges of the sides. Going down one side of the room we observed a very interesting division of labour.

The glasses having been washed, were passed on to the next table, when they were polished with paper, and racked up; these racks, as soon as full, were passed to the next table, which had large vessels containing what appeared to be gelatine.

The chromo transfer backed with paper, was, after being coated from this vessel, stuck on the glasses and placed in a rack; these, as soon as dry, were passed on to the next table and immersed in water. After soaking for about five minutes, the paper backing was detached, and the slide again placed in a rack to dry. At the next table, a cover glass was placed upon each picture, and the binding strip gummed on the edge. Every now and again the pile of finished slides was taken away to the sorting department, boxed, labelled, and stored along the sides of the room, to eventually be placed in the lift, which conveys them to the packing room, and thence to the basement. We were informed that a consignment of 200 gross of assorted sizes of glass for slides, was delivered each week throughout the year. The show room is situated on the ground floor—one portion is devoted to scientific toys, another to lantern apparatus, cameras, and lenses. We saw a new lantern stand, which has just been brought out; this is not unlike a heavy camera tripod, only it is supplied with four adjustable legs, instead of three. We took a look at the basement, which contained numbers of large packing cases.

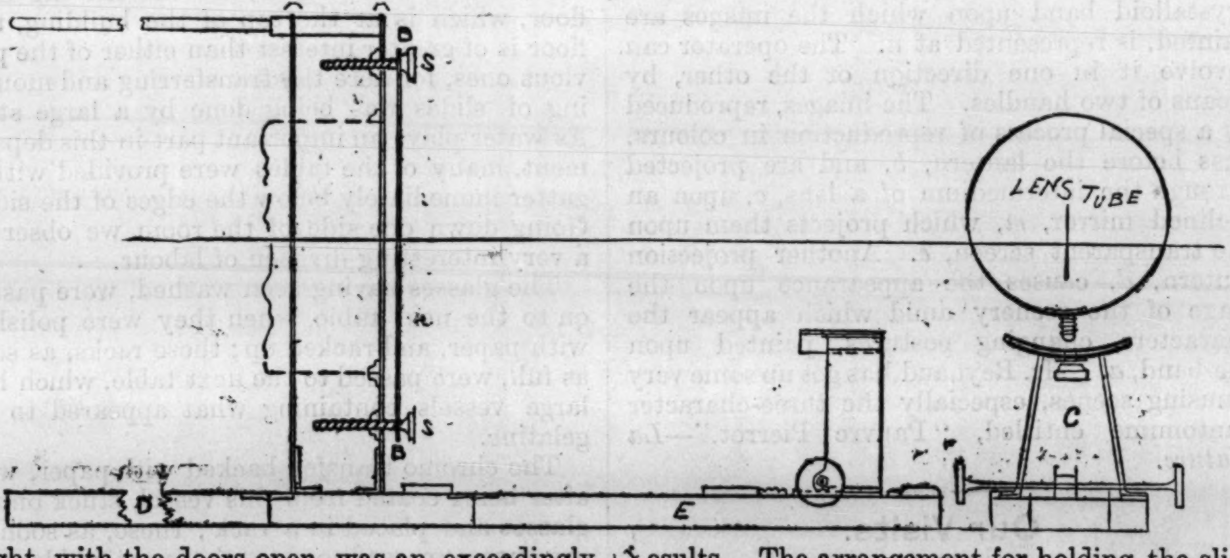
Before leaving, we were told that if any of our friends would like to see what we had seen, they were at liberty to call by appointment.

—:o:—

A Compact and Light Aluminium Lantern.

By Commander C. E. Gladstone, R. N.

A certain amount of experience in working a commercial lantern of the usual form, gradually convinced me that various modifications might be made, which, whilst in no way interfering with its general efficiency, would effect a considerable saving of weight. I had, moreover, become quite convinced, not at all gradually, that driving about in a hansom cab on a winter's night, with the doors open, was an exceedingly disagreeable occupation, and that it was quite necessary to get out some kind of a lantern, which should be of such a shape when packed up, as to admit of its being put inside a hansom, and still leave room for me when the doors were shut. The principal points, therefore, that were borne in mind when designing this new lantern, were as follows:—



1. To save weight, at the same time keeping the body of the lantern of the usual size and form, so as to enable it to be used with any jet, or with an oil lamp.

2. To provide a better fitting for carrying the lens, so as to avoid the great strain and leverage which comes on the front of the lantern when a heavy lens of long focus is used.

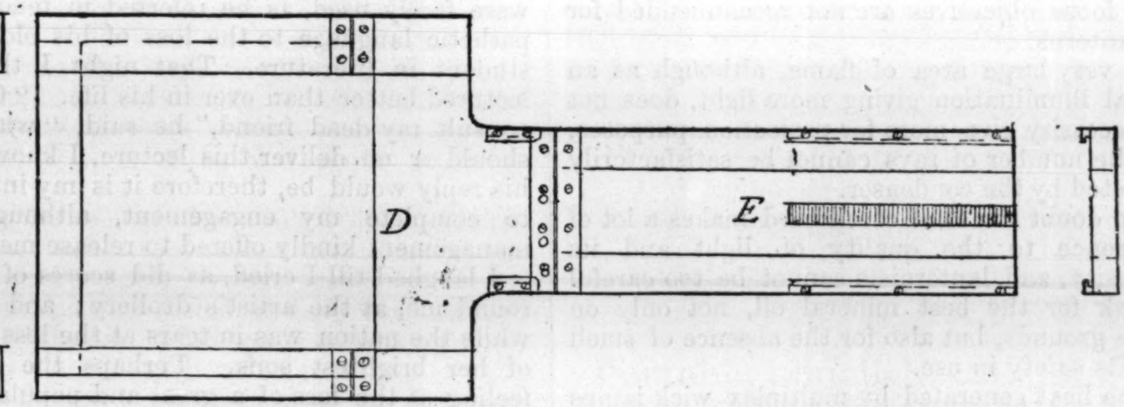
3. To provide a better arrangement for holding the slide carrier than the usual springs.

4. To stow the whole away in a flat box instead of a deep one, to facilitate carrying in the hand.

The saving in weight is effected chiefly by making the whole of aluminium, except certain working parts which it was thought desirable to leave in brass, partly by substituting a curtain for the massive arrangement of wood and iron, which usually forms the body of the lantern, and partly by replacing the brass tube and lens mount in front by a camera bellows.

The whole of the woodwork surrounding the condenser, together with whatever ornamental and weighty brass work there was attached to it, is done away with, and two thin plates of aluminium, *aa*, substituted, having the proper holes cut to receive the condenser, which is a crown doublet of 4½ inches diameter, designed by Mr. E. M. Nelson, and which was found, after practical comparison with several other condensers of different focus, to give the best results. The arrangement for holding the slide carrier consists of a plate of aluminium, *b*, which binds the carrier against the plate carrying the condenser by means of two screws, *ss*. The carrier is thus rigidly fixed, and cannot move or slip. Any kind of carrier can be used. The centre of the plate is of course cut out to allow the light to pass from the condenser to the lens. The lens, *l*, which is a Ross 3a, of 9¼ in. equivalent focus, and 3¼ in. diameter, is mounted in a perfectly plain tube, the rack and pinion being transferred from the lens tube to the saddle, *c*, which carries the lens. This saddle is of aluminium, and works in two grooves fixed to the front board of the lantern, with a rack and pinion, in a similar manner to the mechanical stage of a microscope. The lens is simply placed in the saddle, and held there by a clamping screw, an arrangement commonly adopted for securing telescopes to their mounts. The bellows connecting the lens to the lantern body, are fixed permanently to the plate which holds the slide carrier, and the other end clips over the lens tube with an india-rubber ring. When packed, the lens and saddle are removed, and fit into their own places in the box.

The curtain surrounding the jet is hung from an aluminium rod, which slides into two sockets, which also serve the purpose of securing the two main plates of the lantern rigidly together. The curtain is of black cloth, treated with tungstate of soda, and lined with asbestos cloth. It never gets more than moderately warm when the lantern is in use. The top is of Russian iron, and when packed is half-an-inch deep. For stowing away, the tailborad, *d*, and front-board, *e* (which is only a strip of wood 3 inches wide and half-an-inch thick) of the lantern fold up, and the lantern body then occupies a space of 9¼ in. × 7 in. × 4½ in. It fits into its own place in the box, and the curtain and the curtain rod lie on the top of it. The lens and glass screen for protecting the condenser occupy another partition; the jet, slide carrier, and tubing, another; the iron top another, together with two regulators (or one regulator and a spirit reservoir if the oxy-calcium jet is used), and the lens saddle. The whole of the parts pack into a box 16½ in. × 11½ in. × 4½ in. The old box was nearly twice the width, and certainly more than twice as awkward to carry.



I observed at the commencement, that one of the points kept in view in designing the lantern was, that it should be capable of taking any jet or an oil lamp. This is the case, and it will take either a mixed, blow-through, or an oxy-calcium spirit jet, the only alterations necessary in my old jets being, that the position of the attachments had to be slightly altered to enable them to fit the new jet tray. It will also take an oil lamp, though of course I do not mean to say that every oil lamp in the market will fit straight away, without any alterations whatever. What I do mean, is, that the space allowed for the lamp or jet, is practically the same as in an ordinary commercial lantern.

The following table will show what has been gained in the matter of weight and portability.

	Old.		New.		Difference.	
	lbs.	oz.	lbs.	oz.	lbs.	oz.
Lantern body (with top)	12	2	4	1¼	8	0¾
Condenser	2	8	1	12	0	12
Lens	4	9½	2	1½	2	8
Jet (mixed)	1	13½	1	12½	0	1
Jet tray	2	0¾	0	8¾	1	8
Slide carrier	0	7	0	7	—	
Box	11	4	7	8	4	12
Total	34	12¾	17	3	17	9¾
Cubical contents of box, outside	2634 ins.		1188 ins.		1438 ins.	

About Oil Lamps.

By Flashlight.

When purchasing an oil lantern, *don't* be misled by tempting statements about marvellous illuminating power of lamps, but *see* the apparatus tried practically against a known standard lamp. *Don't* purchase an apparatus because it is low priced only, for no matter how largely a certain pattern may be manufactured, there is a point below which it is false economy to go, as "bushel basket" optical work cannot be produced sufficiently good if rejections do not take place, and then the price must be greater than if "all" made are sold—with or without fault, as the case may be. As regards multiplex lamps, there is as much difference between lamps having the same number of wicks, say for instance three, as there is between the proverbial chalk and cheese. Then, again, some three-wick lamps are far better than four, and in fact, at a recent trial, it was found, using the same oil for each, a triple 1½ inch-wick lamp could not be beaten by any four-wick lamp (patent or otherwise) in the market, and it had the great advantage of not requiring so much attention or delicate manipulation of the chimney for draught way, and wicks for height of flame. It confirms what I maintained, after a trial some years' since, that the triple-wick lamp, with a hood opening at the side and parallel 1½ inch-wicks, is the best "all round" lamp in the market, and gives the best light and flame for projection of photographs with an oil lantern.

If a lantern is only required for the oil light, having of necessity a large area of illumination, the condensers must be of short focus so as to collect all the rays possible, and the objective should be from five to seven equivalent focus, according to the distance it is desired to place the apparatus from the screen to get the required picture. One of 6 inches focus is generally found very satisfactory, for it must be borne in mind, that except for special work, long focus objectives are not recommended for oil lanterns.

A very large area of flame, although as an initial illumination giving more light, does not of necessity give more for projection purposes, for the number of rays cannot be satisfactorily collected by the condenser.

No doubt the kind of oil used makes a lot of difference to the quality of light and its intensity, and lanternists cannot be too careful to ask for the best mineral oil, not only on these grounds, but also for the absence of smell and its safety in use.

The heat generated by multiplex wick lamps is such, that beyond three they are very uncomfortable to use, unless perfectly constructed to ensure perfect combustion. The lanterns must be well ventilated—in fact many lanterns have not sufficient thought expended on their design or construction to give the best effect with the minimum of heat.

The lime-light, with compressed gas in cylinders, and the incandescent electric light, are so clean in their working, and so convenient, that it will not be many years before the paraffin oil lanterns of to-day are consigned to "limbo," with their predecessors the colza and sperm oil "phantasmagoria" lanterns.

——:o:——

Tennysonia on the Screen.

By Harry Wheeler, B.A.

On the 9th day of June, 1870, I wended my way Citywards to hear George Grossmith, the elder, deliver a lecture on "Charles Dickens as a Humourist." I wondered, however, as I went, whether the subject would not be altered, for it so happened, "Dickens," had died that very day. He and Grossmith were closely associated. When young men they had sat, side by side, in the House of Commons as shorthand writers. In after life, Dickens became the literary light of the century, and Grossmith has proved himself, over and over again, to have been the best delineator of the great writer's characters that has been known.

In fancy, I can now see him, as on that memorable night, step upon the platform displaying the only sign of mourning a professional lecturer can well display, a black tie instead of a white one, black studs in place of gold, black watered silk ribbon falling across the white front, and holding the eyeglasses he occasionally used.

Grossmith on that occasion was deeply affected, especially during the introductory paragraphs of his address. Handkerchiefs were freely used, as he referred in tender and pathetic language to the loss of his old fellow student in literature. That night I think he lectured better than ever in his life. "Could I consult my dead friend," he said, "whether I should or no deliver this lecture, I know what his reply would be, therefore it is my intention to complete my engagement, although the management kindly offered to release me."

I laughed till I cried, as did scores of others round me, at the artist's drollery; and all the while the nation was in tears at the loss of one of her brightest sons. Perhaps the general feeling at the loss of a great and popular man, has not been equalled from the 9th of June, 1870, until the 6th of October, 1892, on which latter date, "all sorts and conditions of men" were awakened to the fact that Tennyson, the Laureate King, lay dead.

The poet's description of the passing of Arthur (one of the Knights of the round table), serves as a graphic and truthful programme of his own passing; and no pen or power, can paint so faithfully as his has, a truer ending to a useful life.

As a reader of *The Optical Magic Lantern Journal* from the beginning, I naturally take a deep interest in all lantern matters. Lanternists, like lovers of other studies, have their strong points and their weak points. Tom takes an interest in the illuminating properties of his light, while Jack's *forte* is spouting. Joe considers the chief thing for the success of *his* show, is the perfect colouring of the photographs, aad Aunt Demi-Semi, professor of music, maintains that each, and all, are flat, very flat, unless accompanied by some musical friend of ability. But the literary part of a lantern exhibition surely should take a box (not a back) seat.

A portrait picture of Tennyson will find its way to nearly every lanternist's screen this winter, but they would do well not to let their interest stop there. The Poet has furnished us with hundreds of poetical gems, that I hope will not escape the attention of the hand-camerist. I say hand-camera, because there are such a variety of Nature's pictures, ready worded in the volumes, that if carefully thought out, and worked out, would make a perfect whole, so perfect indeed in perspective, that I doubt whether anything can at present be found to approach them. One can understand that certain subjects are not commercial successes, consequently the business man looks ahead, before he takes his leap. But it is not because this or that, is not to be found in a certain vendor's catalogues, that it is not worthy a place there.

I hear a dissentient saying, "Oh! but we've plenty of Tennyson already; I've only to send to so-and-so, for such and such a set, and they are sent me the same day." "Have you?" I am inclined, kind reader, to the belief that you can count them on the fingers of your hands, as you can those of Dickens or Longfellow.

Look for a moment into early poems, "Lillian," and if you have a pretty sister, ask her to dress carelessly and poise as Lilian. One good picture would suffice, two perhaps would be better, while you in a very short time get the thirty lines to memory. "The Lady of Shalot," is another short bit, that with a little thought could be made much of. "The Deserted House," "The Merman," and "The Mermaid," each might be treated to a slide or two.

In the English Idylls, are many choice poems. Read "The Sisters," truly a fine dramatic piece, with but six short verses; but they each mean so much. But take a poem, reading about ten minutes, of which there are many, and for our illustration we select the "Grandmother," which contains twenty-seven verses. Ten or twelve pictures and a bi-unial will give the desired effects:—Slide 1, "And Willie my Eldest Born," is an interior; old lady seated in armchair in conversation with her grandchild. Slide 2, verse 3, "Here's a leg for a babe of a week," interior, nurse holding baby surrounded by three or four others, with doctor in centre laughing. In verse 4, repeat No. 1, cue, "I cannot cry for him." Slide 3, verse 6, "I remember a quarrel I had," a garden scene with young man and woman in foreground, having a lovers' altercation. Slide 4, verse 8, "And the parson made it his text that week," exterior of village church, in Summer. Slide 5, verse 9, "And Willie had not been down," farmyard scene. Slide 6, verse 10, "The moon like a rick on fire," farmyard scene by moonlight. Verse 12, repeat No. 3, cue, "Let us part." Slide 7, verse 14, "He turn'd and claspt me," farmyard by moonlight, with lovers in foreground. Verse 15, repeat No. 1, cue, "He gave the ringers a crown." Slide 8, verse 18, "But he cheer'd me," domestic interior. Slide 9, verse 20, "Pattering over the boards," interior, with three or four figures, and child in foreground. Slide 10, verse 21, "And Harry and Charlie," meadow with men ploughing. Verse 22, cue, "Willie my eldest born," repeat No. 1. Slide 11, verse 27, "Get me my glasses, Annie," same as No. 1, but with child putting spectacles on old lady's face.

In Tennyson's works the lanternist will find couplets and snatches of song, to trim and give flavour to his lecture, let his subject be what it may. An example from my tour through the Highlands, will be a fitting close to this article. Scene, "The Hermitage and Bridge," Wilson's series.

> "Flower in the crannied wall,
> I pluck you out of the crannies;
> Hold you here, root and all, in my hand.
> Little flower—but if I could understand
> What you are, root and all, and all in all,
> I should know what God and man is."

——:o:——

Portable Limelight and Lamp.

To our English readers the two illustrations herewith will appear quite novel in the way of lantern outfits, and certainly, for that matter, we might perhaps say, most of our foreign readers also.

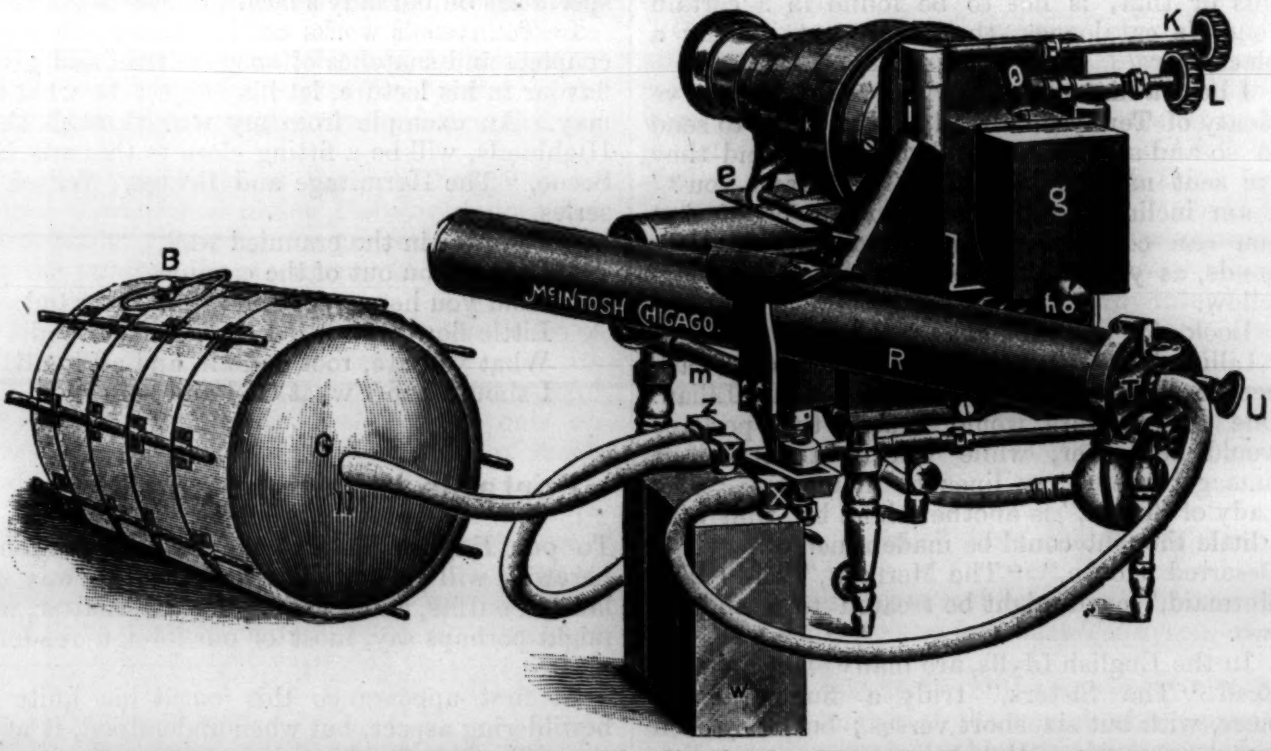
At first appearance this outfit has quite a bewildering aspect, but when understood, it will generally be considered a most ingenious and useful apparatus.

This portable outfit has just been introduced by the McIntosh Battery and Optical Co., 141, and 143, Wabash Avenue, Chicago, U.S.A.

The principle involved is the heating of small portions of the chemicals as the operator sees his need of gas. The gas, as made, is carried into a small equalizing or regulating bag, so that the supply is constant, and is maintained at a steady pressure.

In order that only a portion of the chemicals may be heated at once, the retort, R, is made of poor heat-conducting material—tin; it is two inches in diameter and twenty-six inches in length. The oxygen regulating bag, B, is of strong rubber-cloth, two feet in length, eleven inches in diameter when filled, and holds about ten minutes' supply of gas.

The equalizing pressure is obtained by several strong rubber bands, which close the bag, and tend to keep it closed. As the bag fills, and the outward pressure surface becomes greater, the tension of the stretching rubber bands increases in about the same ratio. This gas-making apparatus is so arranged, that it becomes the framework of the lantern. The wash bottle, W, and the bag, can be packed in a very small compass, and the entire outfit can easily be carried in one hand. The expense of operating, both in time and money, is very small, the gasoline cost hardly more than one half-penny an evening. The cost of the oxygen varies with the price of chemicals, some two pounds and a half being used. None is ever wasted. Ten minutes is all the time required, from the unstrapping of the packing case, to the lighting of the jet. The cleaning up and recharging can be done at any time, and will take fifteen or twenty minutes. The tank is very strong and air-tight, and holds only about 16 ounces at the most. There is only a cubic inch or so of gas at any time, and no chance of an explosive mixture. In the oxygen manufacture the only point of activity at any one time, is an inch in length of the two-inch tin retort.



DIRECTIONS FOR MANAGING THE PORTABLE LIME-LIGHT AND LANTERN.

Fill gasoline tank E with 16 ounces high-grade gasoline, not less than 80° flash test. To fill E, you unscrew FF (F screws into FF) entirely, and use a small funnel; 16 ounces fills E about three-quarters full. Replace F F, screwing it down firmly, and if a little hard soap be smeared over the faces of the union, a perfectly gas-tight joint will be made.

Loosen F, and pump in a pressure with hand bulb pump A, by squeezing it firmly half a dozen times; then close F.

From time from time during the evening pump in a pressure.

Charge retort R, with a single package of chemicals, each package containing 32 ounces of potassium chlorate, and 8 ounces manganese binoxide, thoroughly mixed.

Fill wash bottle W, through X, with 4 ounces water, in which one-half teaspoonful of caustic soda, or potash, or common "sal soda," has been dissolved. This alkali purifies the oxygen, takes up the chlorine, and renders the oxygen sweet and almost pure enough to breathe.

Connect T to X, Y to G, *l l*, Z to V, and *l* to B, with pieces of rubber tube.

Open valves J, and allow generator cup, to be filled with liquid gasoline; then close J, and light under *r*. This should burn like an ordinary gasoline stove, and furnishes heat not only for generating oxygen, but also converts the liquid gasoline into gas, forcing it up through *i*, where it is admitted to mixing chamber Q, through valve K.

Secure retort R in place.

Put a lime in lime-holder in *g*, about ⅛ of an inch from nipple.

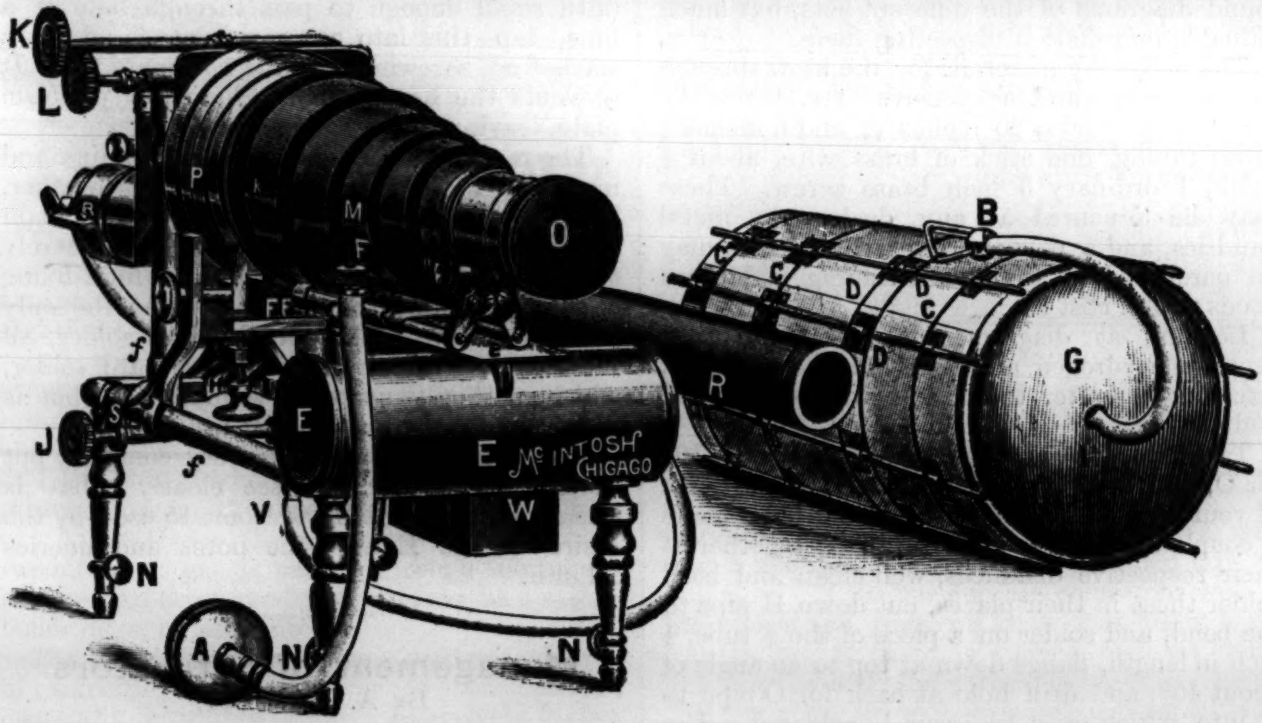
As soon as oxygen is liberated freely (as will be indicated by the gas bubbling through W, which can be plainly heard), open valve K a this littleand light; this admits gasoline gas, and flame at first should be three or four inches long.

Open wide valve L; this admits a full supply of oxygen.

Now increase or diminish the supply of gasoline gas by valve K, until the whitest light is obtained. If oxygen has been made too fast, a hissing sound will be heard, and both valves, K and L, must be manipulated back and forth, until the whitest light is obtained without noise.

In closing or shutting off at the end of the entertainment, shut valve L first, then valve K.

In placing R over the generator burner, only 1½ or 2 inches should be heated, and when it is pushed along over the flame, it should only be by a ½ inch at a time, or gas may be made too quickly, it will escape through the safety valve B, on the bag.



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The Lanternist's Den.—No. 4.

Blow-through Jet.

By C. E. Rendle.

Following up the success which attended my efforts in constructing an oxy-calcium lamp, already described in these pages, I soon decided to go further, trying my hand this time at a blow-through jet. Being fairly satisfied with the result, it is only reasonable and just, to communicate my experience, that others may also try if they are so disposed. Speaking to a brother lanternist some few days ago on the subject of jets, he produced one which, he informed me, was being largely advertised at a low price. "The figure induced me," he said, "to purchase one, cheap and nasty, and" he continued, handing me the article (which by the way was a mixed jet), "nearly blew my head off." I found upon examination, that the oxygen tube, instead of being tapped (and well tapped too) into the block of the mixing chamber, had only been badly fitted in, left perfectly smooth, and filled round with soft solder. The consequence was, as soon as that part of the arrangement got hot (and we all know it does get hot), the solder ran out, and out too came the pipe as soon as the thing was moved. "I had just turned out the gas," said my informant, "when I found it out, and was really thankful to think my exhibition was over without mishap."

Here was a scurrilous bit of work, I cannot speak from a professional training, but I am of opinion that any workman, with ever so scanty a knowledge of mechanics, will agree, that to put such an imperfect piece of apparatus on the market, is a libel on their craft, more specially so, as they cannot foresee what may follow. I cannot think anyone would sell such, knowingly, but rather it is the slovenly way that some men have in finishing off their work, and of which, in many cases, the master knows little or nothing.

There has been plenty of argument lately, as to the practibility and safety of saturators, but, up to the time of writing, I don't feel inclined to enter into the controversy, as I deem it is best, first to assure ones self of the safety of our own paraphernalia, than to try and upset the inventions of gentlemen, whose knowledge of their studies is as a rule in advance of the would be fault finder. Therefore, it must be maintained, to be an expert in the manipulation of the lantern, we should be proficient in the many little parts that go to make the perfect whole.

First thing to do then in the case at issue, will be to provide ourselves with a diagram of our objects. This can be found in most lantern catalogues, or our advertisement pages. Perhaps better still is to procure—if you don't happen to have it—*The Optical Magic Lantern Journal* for September, 1889, where not only will be found diagrams of the different jets, but much valuable information respecting them.

The necessary materials for the blow through jets, are simple and inexpensive—viz., two of the smallest gas cocks, 20 inches $\frac{3}{16}$ and 6 inches $\frac{5}{8}$ brass tubing, one stick of brass wire, about $\frac{1}{8}$ thick, 1 ordinary 3 inch brass screw. These may be procured at any dealers in metal sundries, and a pair of brass bevil wheels, may be purchased at any house trading in lantern goods; total cost 2s.

Looking at diagram, let left hand tube represent hydrogen, and right hand oxygen gas; referring hereafter to these, I will do so as H and O.

Take two lengths of $\frac{3}{16}$ tube, 9 inch for H, $10\frac{1}{2}$ for O, and bend with your fingers to the form of your design. From a piece of flat brass make a couple of stays, to hold the tubes together at their respective distances, well clean and hard solder these in their places, cut down H pipe to the bend, and solder on a piece of the $\frac{5}{8}$ tube, $\frac{1}{2}$ inch in length, flange down at top to an angle of about 45°, and drill hole at back for O pipe to fit into, which must be securely soldered. The aperture at end of O tube should not be left too large—say $\frac{1}{64}$ of an inch. The ends of the inlets may now be fitted into the taps tightly, but may be removed again, until the last thing. Now make a pillar to fit the pole of your iron tray, which can be done from a $1\frac{1}{4}$ length of $\frac{5}{8}$ tubing. Turn up a ring of flat metal, rather stout, and $\frac{1}{4}$ inch deep. Fit and solder round outside of pillar at one end, this is the top. A hole may now be drilled on the side, tapped, and a screw made to it. For the head of this screw, a small clock wheel may with advantage be used, as it gives the fingers a good purchase.

Solder pillar on the stay nearest the inlets. The sliding platform and lime arrangement will claim our attention next, and the adjustment of the bevil wheels must be done to a nicety, or they may be useless. The platform itself is very simple and straightforward, as the diagram shows, and speaks for itself. Place in their relative positions the two bevil wheels, marking the centre of the vertical wheel, on the upright plate of platform, with a steel point, or some sharp tool. Open a hole only large enough to allow the stick of brass through, which may now be fixed to the wheel. This rod also passes through a loop in pillar, which, by the way, must be fixed there for the purpose. The hole in bottom of platform plate must be opened to take the wheel laying horizontally. The brass screw is divided into three, but not cut. The head end is to be filed perfectly square, about 1 inch up, this square end to just play through square hole of wheel, the reverse end to be evenly filed until small enough to pass through hole of a lime, tap this into a screw plate, and fit a washer on, screwing it to the bottom of pin. It prevents the lime from touching top platform plate, leaving it free to revolve.

The reader must exercise his own brains and ingenuity in fitting up and putting together. There only remains the taps to be again forced on their respective pipes, and securely soldered with soft solder. I left the final fixing of these taps until the last, they being the only parts that have been treated to soft solder, all the other pieces are secured with hard solder, which not only makes a sounder job, but is necessary for the heat the jet has to bear.

The forgoing may appear very complex, but should any reader not see clearly what is intended, he is cordially welcome to use—by the desire of the Editor—the notes and queries column.

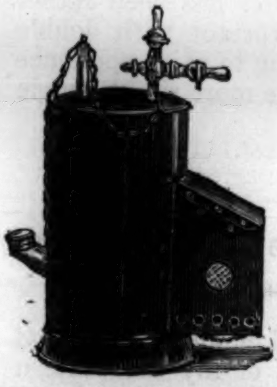
—:o:—

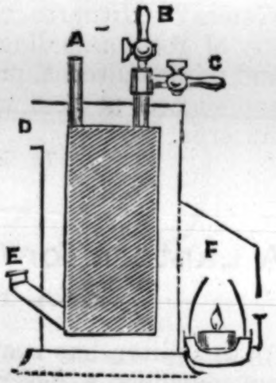
Management of Saturators.

By A. W. Scott.

The employment of saturators for lime-light seems to be steadily increasing, as lanternists gain familiarity with their capabilities and peculiarities. A short account of the features of construction and manipulation of the warm air saturator, which is a speciality of the writer, may be acceptable, as such has not hitherto appeared in a complete form in *The Optical Magic Lantern Journal*, and enquiries received by post indicate that a certain number of persons are contemplating the adoption of this system during the season just commencing.

The description of the warm-air saturator as it appears in the patent specification, has—thanks to the intervention of a criticising gentleman, himself a maker of saturators of another pattern—recently received the honour of publication in this journal. It is not, therefore, requisite to repeat all the details so given. I will merely state that the warm saturator consists of a small copper cylinder, tightly stuffed with wool or other porous material, and which has a lengthy circuitous air passage, or perforated tube inside it, the ends of which are connected to the pipes, A and B, shown in the illustration. The tube, E, at the bottom, serves for filling with fluid.





The stuffed vessel is enclosed within a larger vessel, leaving a space between the two; this air space is filled with warm air supplied by a nightlight, F. The current of warm air circulates round the upper part of the saturator, and eventually escapes through a vent hole, D. The lower part of the saturator remains cool, and any fluid that is not absorbed by the stuffing, and drains to the bottom of the inner vessel, is preserved from the heat, and therefore does not boil. Hence the apparatus only gives off vapour when gas is passed through the tubes; it is incapable of producing vapour as a steam boiler does, by ebullition.

The advantage of applying a moderate degree of warmth to a saturator is considerable, especially in cold weather. Everybody knows that evaporation is greatly aided by heat; if we hold a damp cloth near a fire, we can see the vapour coming from it in clouds, and it is soon dry. So if we pass a current of gas over a warm surface saturated with ether, the vapour of ether comes off easily, and the gas is densely saturated with it.

We will suppose that our saturator is fully charged with ether, and is, at first, not heated, being in a room where a thermometer stands at about 60° Fahr. We will now turn off tap, B, attach a length of rubber pipe to tap, C, and with the mouth, blow gently through the rubber tube and the saturator; the air picks up vapour on its way, and escapes from, A, in an inflammable condition. We will first blow out any pure oxygen that may happen to be in the pipes, and then apply a light to, A. There will be no pop or explosion, but a flame will rise from A, which varies in size to the quantity of air blown through; if a flame two or three feet high is obtainable, we are assured that the saturator is in working order, and that no "short circuiting" of air is taking place inside the saturator.

Now we will warm the saturator by burning a night-light in the side chamber; after ten minutes, we may repeat our test: we at once find that the flame is *much larger*. In fact, the hotter the saturator is, the more vapour is imparted to the gas passed through, and a flame six feet high can be easily and safely produced with air from the mouth. A caution is here necessary:—the test should be made with *air*, not *oxygen*. If a slow current of oxygen were passed through a cold saturator, and a light applied to *a*, we should get a pistol-pop, harmless enough, but rather startling; and even in the case of a warm saturator, which is much less liable to pops, it is not advisable to light the vapourised oxygen, unless it is burnt from a proper jet.

There is another test which may be applied to the saturator, in order to ascertain if it is air-tight. Before charging the vessel with fluid, we will put a sound cork in A, turn off tap, C, and screw down the cap, E, tightly. Now, with the mouth applied to B, we can blow forcibly into the saturator, and then quickly turn off the tap, B. The air in the vessel is now slightly compressed, and if there be any leakage it will escape, until the pressure of air inside the saturator is equal to that outside. We will wait a minute or two, and then re-open tap, B, suddenly. If the surplus air comes out with a little noise and rush, we know that there is no leakage, but if there is silence, then we must hunt for the leak and correct it.

Being now, we will suppose, in possession of a saturator in good order, we will next examine the jet, which of course, is a mixed-gas or chamber jet. We first see if it is air-tight in its joints, by turning off one stop-cock, putting the finger on the aperture of the nipple, and applying the mouth to the other stopcock, we can produce a partial vacuum in the tubes by suction; and on putting the tongue to the end of the stopcock nozzle, we observe that the tongue is pressed against the brass by the action of the vacuum; if there is any leakage, air will find its way into the jet, and by destroying the vacuum, relieve the tongue from the pressure. Any such leakage should be corrected before using the jet.

Another test for the jet is to ascertain if it is likely to hiss. Remove the lime-pin temporarily quite away from the nipple, and turning off one stopcock, blow forcibly through the other, and listen for the sound of the air as it issues from the nipple. If it hisses, the jet will hiss when used for the lime-light; if it is silent, it will probably be silent during the exhibition. A hissing jet can be best cured by a lime-light expert.

For saturator work, the mixing chamber should be spacious and packed with a flame proof material. Finely sifted pumice grains are the best for use with an oxygen gas bag, as they do not reduce the gas-pressure much; but with a cylinder of compressed gas, a handier packing is cotton-wick damped with glycerine. The packing should be placed between discs of wire gauze at the top and bottom, which may be strengthened by perforated plates of brass or platinum. The packing is very beneficial in preventing pistol-pops, and inducing thereby a feeling of security and ease on the part of the operator and people near the apparatus.

Having a jet which is so far correct, we may proceed to connect it to the warm-air saturator by two *thick red* rubber tubes about a foot long. These pipes should be nearly upright, the saturator being at a lower level than the jet.

Connecting a gas bag or cylinder to tap, C, of saturator by a flexible tube five feet long, we can pass a current of oxygen through the saturator, via the A tube to the jet; on lighting this gas as it issues from the nipple, we obtain a flame about six inches high, resembling the flame of coal gas. Next we turn on the pure oxygen which comes via the B tap to the jet, and then adjust both taps of the jet till the limelight is at its brightest.

Now, if the jet is perfect, there will be no noise or hissing, no flickering or quivering of the light. The area of incandescence will be a perfect oval or circle about an inch in diameter, there will be little or no flame above the lime, no shivering bits of flame darting off in odd directions. Everything should appear motionless and noiseless, and no flame should rebound from the lime and strike the nipple, causing it to corrode and wear away. A jet which does not act thus, is not in perfect order, it wastes gas and vapour, and does not give the proper amount of light. A faulty jet should be sent to an expert to be doctored. Of all the jets made for coal gas, scarcely one in twenty is fit for saturator work without more or lessad aptation.

With regard to the fluids, *ether* is the most convenient for general use, it is obtainable in most large towns, and is easy to work with. It gives a maximum light of about 500 candles.

Benzoline is much cheaper than ether, and answers fairly well for single lantern with warm saturator. It is capable of giving 800 candle-power with the best jets.

Gasoline is undoubtedly the best liquid of all, in cost being intermediate between ether and benzoline. It gives a light equal to benzoline, and is as volatile as ether, hence it is well adapted for dissolving lanterns. It is only sold in eight-gallon cases, and is not obtainable in smaller quantities, except here and there from dealers in warm-air saturators.

Now we come to the question. Can dissolving views be properly exhibited by a saturator system? Hitherto, the writer has been rather shy of recommending a saturator with double and triple lanterns, preferring to gain experience and success at first with the more simple single lanterns.

(To be continued.)

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A Lantern for General Purposes.

By A. T. Hare, M.A.

As the editor has been good enough to say that he considers a description of my old lantern likely to interest readers, I have put together a few notes describing the various little points, which a tolerably long experience has suggested, and which I have from time to time embodied in its construction.

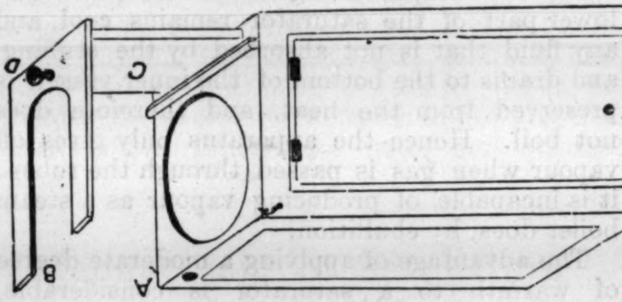

Fig 1.

Firstly I must premise that, as I intended the lantern not merely for projecting slides, but for all kinds of purposes useful in physical lecturing, I made the body rather bigger than usual. It consists of an oak frame 16 inches long, 12 high, and 9 broad. The bottom only is filled in (save for air holes), the top, both sides, and the back being open to their full width. The top has a cover of japanned tin plate, removable when a paraffin lamp is used, and not shown in the figure; the sides have oaken doors (lined with tin plate as usual), and the back is closed by a black velvet curtain. The front has a circular aperture, 8 inches in diameter, below which is a ledge, from the top of which ledge two pins project about a quarter of an inch, and below this is a slot, extending right under the lantern, and allowing an oak slide (*c*, Fig. 1), to be drawn out to the extent of 14 inches. The lantern body is shown in Fig. 1. There are two frames (Figs. 2 and 3) which carry, the one an ordinary pair of 4 inch, the other a pair of 7 inch, condensers. To the former can be attached, by the two thumbscrews, shown in Fig. 2, the slide carrier (of oak), shown in Fig. 6, or, if desired, another carrier (Fig. 7) having two springs, like a certain kind of microscope stage, so that tanks, &c., can be attached in front of the condensers, full access being had to the top.

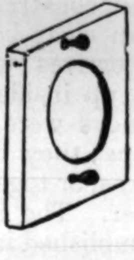

Fig. 2.

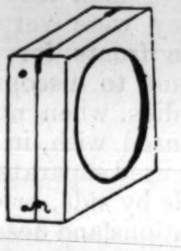

Fig. 3.

The 7 inch condensers (Fig. 3) are mounted in oak frames, hinged at the top, so that the front lens can be turned up out of the way if desired, or can be raised to the horizontal, a reflector of silvered plate glass backed with oak, being adapted by pins, and held by hooks and eyes, as shown in the figure. In this position the lantern can be used for vertical projections. When it is so used, a brass pillar screws into the corner of the lantern, marked *a*, in Fig. 1, to carry objectives, and a total reflection prism. The two sets of condensers can be changed the one for the other in a few seconds, and the pillar and prism can be left on throughout the lecture.

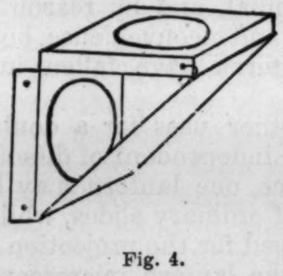

Fig. 4.

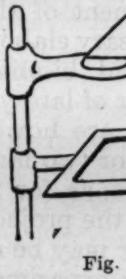

Fig. 5.

The slide (*c* Fig. 1) carries at its end a frame *b*, into which can be dropped in a moment, any one of the rising fronts of my camera carrying its objective, so that a large range of focussing is immediately available, the fine adjustment being performed by the rack and pinion of the lens itself. A small socket and set screw (*d*, Fig. 1,) allows a small table, adjustable in all directions, to be attached in front of the objective, to carry a prism or coloured glasses, &c., for spectroscopic demonstration, or developing enlargements on the screen. The same camera-fronts fit also into the frame, shown in Fig. 5, so that the objectives are also available for vertical work, and it will be seen that this method gives complete range of adjustment for centring.

The lime-jet is rather different from those usually constructed, and presents some very useful features. It is shown in Fig. 8, where it will be seen that the tubes carrying the two gases are disposed vertically, instead of side by side. These tubes have main taps in the usual positions for adjusting the amounts of gas, and two extra taps (*a* in the Fig.), the handles of which are connected by a parallel-ruler-motion, and turn up and down by a cranked wire, *b*. This forms a simple modification of "Pringle's cut-off."

The two tubes are soldered to a vertical tube, *c*, slipping easily over an upright steel pin, and the whole arrangement is solicited to turn about this pin as an axis by the spring *d*, being hindered from doing so by the point of the milled-headed screw, *e*. This gives a fine adjustment of the light horizontally. The steel pin on which the jet turns, is not fastened as usual to the tray, but to a separate piece of board, *f*, hinged to the tray at its front end, and urged upwards by a spring beneath, and moved slowly downwards against this spring by another milled-headed screw, *f*. It will be seen that with the right hand on the screw, *e*, and the left on *f*, the demonstrator has a complete fine adjustment of the light both vertically and horizontally, an advantage which only those who have tried difficult projections in polarised light, &c., can appreciate. It has often surprised me that these simple adjustments, which cost me a few pence only, should so seldom (if ever) be found in the jets ordinarily sold. The only adjustable jet I have seen, was one by a first rate London optician, and was certainly a beautiful piece of apparatus; but it had cross slides in brass, like the slide-rest of an engineer's lathe, and though costing about as many shillings as mine cost pence, was not in the least degree more effective or convenient. The lime pin is fastened by a slotted brass strip and a set screw to the side of the tubes, and can be set leaning forwards, often a most advan-

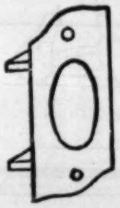

Fig. 6.

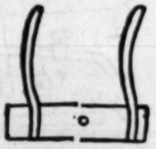

Fig. 7.

tageous position. The "tray" of the jet is simply an oak board running in a dovetailed groove on the floor of the lantern.

In conclusion, I may point out a few advantages secured by the above arrangement. The long body and wide doors permit easy manipulation inside the lantern, where the salts of sodium, lithium, and other easily volatilisable metals can be burned on pieces of graphite in the O.H. flame, and their spectra projected, and similar experiments performed. The slide, *c*, permits of rapid focussing with all kinds of lenses, and allows apparatus to be inserted between the condensers and objective, such, *e.g.*, as an absorption-flame for reversing the sodium line, or a revolving disc driven by an electric motor for producing intermittent light. It also renders possible a number of experiments which usually require the aid of loose focussing glasses. If a beam of light is required from the condensers only, as is often the case, the slide can be pulled right out in a moment. I have a conical nozzle which fastens on to the set screws shown in Fig. 2, and which can be applied where it is desirable to exclude all stray light from the room, but this is rarely necessary. To the last mentioned set screws also can be attached a box containing a bundle of glass plates for producing polarized light. The power of immediately changing the objectives by merely dropping in a camera-front, is a very great convenience. The rapid change to a vertical lantern is also most useful in a lecture where time is of importance.

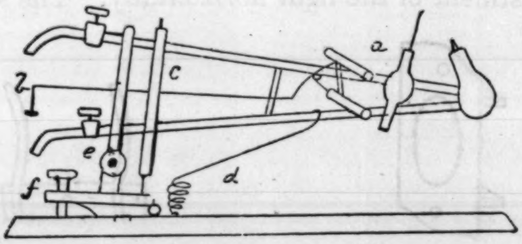

Fig. 8.

The whole lantern was made at home many years ago, and as the only things bought were the condensers and the reflecting prism, I think I may say that the entire cost to me was under £3.

If any of your readers profit by any hint conveyed in the above, I shall be very much pleased, and I can assure them that, after some years' experience, I have thoroughly tested the apparatus, and can confidently recommend the design. The adjusting lime-jet, particularly, when once used, seems more like a necessary than a luxury.

Small Lantern and Dissolving Views.

By W. I. Chadwick.

The practicability of reducing the size and diminishing the weight of Magic Lanterns, occupied my attention many years ago. In the *British Journal of Photography* of May 1878, I published a description with illustrations of two small lanterns, which I had constructed, they were very little larger than cigar boxes, the fronts for carrying the objectives where made to disconnect, and to pack up inside the bodies, when not in use. Chimneys were dispensed with, in favour of flat tops; they could be used separately as single lanterns, or together side by side, or one over the other. The illustrations and descriptions were republished in the Magic Lantern Manual, of the same year. Thus it will be seen that contracting the size, dispensing with chimneys, and packing the fronts inside the body, is not the new idea many people suppose it to be, with those little lanterns I have given dozens of successful exhibitions at the Manchester Photographic Society, and else where, showing the pictures to 20 feet square. But for a long time and down to a few years ago, the bi-unial lantern—*i.e.*, two lanterns in one body, one over the other—was the prevailing design for so called high class lanterns, the object of two lanterns, being, as everybody knows, for the production of "Dissolving Views," and in these days of lenses of various foci, or long focus objectives, the bi-unial lantern has grown into a very heavy, elaborate, and expensive instrument. The triple lantern is a higher development of the bi-unial, and by reason of unnecessary elaboration and inconvenience, both triple and bi-unial lanterns have fallen into disfavour of late years.

There are however other uses for a double lantern, or two lanterns, independent of dissolving views, as for instance, one lantern may be used for the projection of ordinary slides, whilst the other may be employed for the projection of scientific experiments, the lantern microscope, polariscope, &c., &c.

But to return to dissolving views, it has been said that this way of exhibiting, improves poor slides, and also helps out a weak lecture, and that it has a very pretty effect, so, if people want dissolving views, they must have them.

What is meant by dissolving views, is that one picture fades away, or dissolves simultaneous with another picture, being made visible—*Developing*—on the screen.

To produce this effect two lanterns are indispensable; with a single lantern we may have quick changing carriers, panoramic carriers, or others to produce an out-of-focus effect, or an eclipse or semi-eclipse during the change from one picture to the other, but the true dissolving effect is only possible by two lanterns as has already been said.

Now it matters not what form these two lanterns take, they may be placed side by side diagonally as in Dancer's lantern, or one over the other as a bi-unial lantern. The idea that a bi-unial lantern is more conveniently manipulated by one operator, may be entirely dispelled. The proper place for a lanternist to stand is at the back of his instrument, and with a properly constructed pair of lanterns everything is within reach, and the opening and closing of side doors and constant adjusting of the objectives for focussing the slides, is rendered absolutely unnecessary.

The contrivance for dissolving one picture simultaneous with the developing of the next, was originally a "comb" or serrated "fan," worked in front of the objectives by a mechanical arrangement for gradually cutting off the rays from one lantern, with the gradual opening of the other lantern.

The late M. Noton, of Manchester, used an iris diaphragm in front of each lens, and by a lever communication, one was closed as the other opened; by these arrangements it was necessary to maintain the full light in each lantern during the exhibition.

Mr. Dancer, of Manchester, conceived the idea of turning down the light of one lantern simultaneous with turning it up in the other lantern, and constructed a series of taps actuated by one lever, and immediately after this M. Noton combined the use of these several taps in one plug and body.

Since these the dissolving tap has been slightly modified in design, but it has never been improved; on the contrary, durability and effectiveness has been sacrificed for fine appearances. In some of these fancy looking taps, six ways are opened and closed in line, on the circumference of a plug ¾ of an inch in diameter, the object being to get a short plug for compactness—the very thing that it ought not to be. Every mechanic knows that a long plug, like a long bearing, works better and holds the lubricant. With six ways in so small a circumference there is too little room for tap to keep tight, the slightest dust or grit cuts the plug, and soon it becomes stiff and jams, or permits the passage of gas from one side to the other, and as a result little explosions by the mixing of the gas in the tap, are not unfrequent. A well made dissolving tap ought to be provided with a long plug, with the oxygen openings separated from those of the hydrogen by at least an inch in the length of the plug, and between these there ought to be a groove turned in the plug, say ⅛ in. wide and deep, with a hole to correspond in the body of the tap, so that in case the plug did not fit tight, the gases could not mix, but would escape by the hole in the body, and in this arrangement there are only three openings in the circumference of the plug, therefore more tap and more surface to hold a lubricant. In some of these elaborate looking taps two bi-passes are provided, one on the oxygen side and another on the coal-gas side. The latter is necessary to maintain a light, but the former serves no purpose whatever, unless it be to increase the expense.

Another method of changing the pictures, and which is a pleasant change from dissolving, is that of one picture rolling up from the bottom displaying another underneath; this is called the roller curtain effect. In a bi-unial lantern it is produced by a thin metal shutter passing between the face of the condenser and the picture; the length of this shutter is just in excess of the distance between the optical systems, so that when the light from one lantern is shut off, the other is open, thus when the shutter is half way, the sky of the top picture is covered, and the sky of the bottom picture is showing on the screen, of course where this is used the light in both lanterns must be at full.

Now it will be seen that when dissolving from one picture to another, this curtain shutter must be entirely removed from the lantern, and when we desire to introduce the curtain effect, the shutter must be introduced when the top light is turned down. As soon as the shutter covers the top condenser, the light must be turned up, and as the shutter is lowered, the picture in the bottom lantern has the appearance of rolling up from the bottom, displaying another under it (shown by the top lantern). At this stage we have the bottom lantern shut off, and the only way to open it is to draw it up again after the picture has been changed, thus the effect of rolling must always be done *twice* together every time it is used, owing to the fact that the shutter can be removed only from the top.

In a pair of lanterns working side by side, a similar effect can be produced, but instead of rolling up and down, the pictures are introduced sideways, and has the appearance of an unfurling pamorama, and as the shutter may be introduced or withdrawn from either side, the effect may be produced at any time, and for once only and done with, as for instance, when we wish to skip from one subject to another, or from one part of the country to another.

But the finest effects in changing, may be described as a cross between dissolving and the roller curtain. This method was adopted by Mr. Kirnon, the skilful operator to Mr. Rajan, the American lecturer, who visited this country in the early part of the present year.

In the Great Free Trade Hall, Manchester, these lectures had a run of some weeks, and, as regards lantern manipulation, I have never seen it excelled, if equalled. The screen was 36 feet square, and the picture shown to 33 feet square, brilliantly illuminated by lime-light.

As seen by the audience, whilst one picture was on the screen, another began gradually to develop, and when this was fully out, the departing picture was not dissolved in the usual way, but as a friend of mine expressed, it seemed to "fly away," or to be "blown away." Sometimes its departure commenced from the bottom, and finished at the top, sometimes it flew away from one corner, and then from another, and in a variety of ways it mysteriously vanished. At other times they were quietly and steadily dissolved to the end, and at other times by an instantaneous flash from one to the other.

By the kindness of Mr. Rajan and his clever operator, I was permitted to see the whole manipulation of these effects.

Two lanterns were used, placed side by side, the space between the condenser and the objectives, was entirely open, whilst a picture from No. 1 lantern was showing, the dissolving tap was turned until the next picture was fully developed. By a gentle sweep an ordinary lens cap was applied to the back of the objective of No. 1 lantern, and depending upon the way in which this cap was applied, first from one side, and then the other, so the picture vanished, the dissolving tap was then turned further, to shut off the light of No. 1 lantern, a new slide introduced, and so the whole goes on with variations, at the discretion of the operator.

Now it will be seen that capping the lens from the back of the objective, is very different to the rapid or abrupt cut off by capping in front of the objective.

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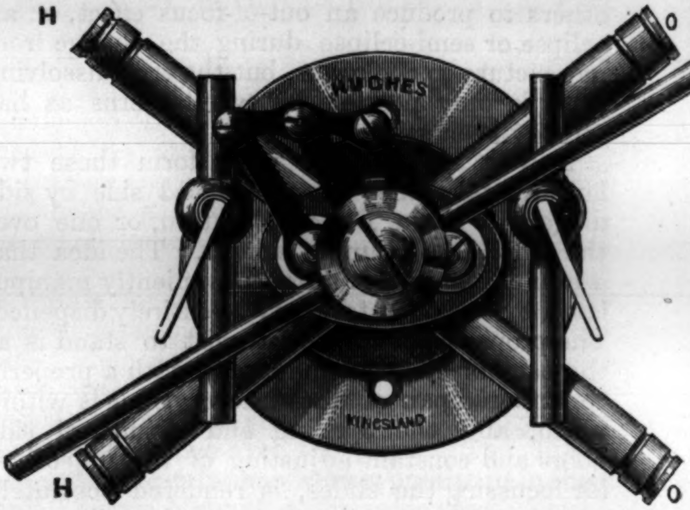
New Lantern Apparatus.

In order to prevent the possibility of the mixing of gases through the misfit of the plug in the star form of dissolver, Mr. Docwra has devised, and Mr. W. C. Hughes, of Kingsland, introduced a new form. Instead of both gases being controlled by one plug, two plugs have been introduced, which, though separate and distinct one from the other, are controlled by one lever, placed in the same position as the old form. The plugs and the dissolving handle each have a projecting end, which are connected together by a rod, so that they all move together with one movement of the lever.

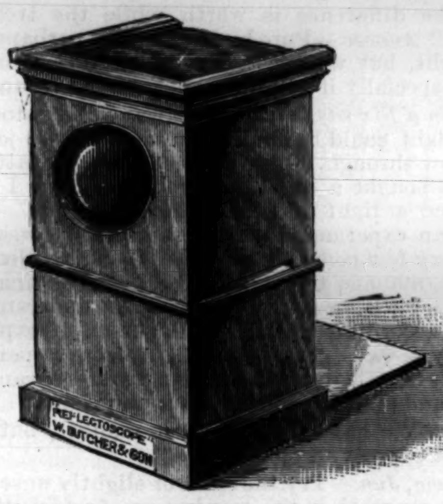


Mr. Hughes has also just brought out a neat portable and rigid reading desk, a new pattern pamphengos (shown in his advertisement, on another page) an electric lantern and projection microscope.

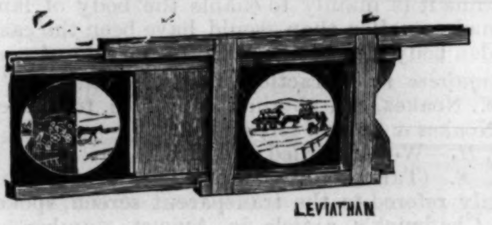
To assist those who experience difficulty in registering effect slides, Messrs. Newton & Co., of Fleet Street, E.C., have introduced sets of registering slides holders. A separate holder is required for each framed slide; it consists of a metal frame, in which the slide can be held in any desired position. The adjustment is made whilst the holder is in the lantern stage. With this adjunct a dozen effect slides can be registered in as many minutes.

The same firm have also a thin carrier, by which framed slides can be passed through a single lantern pamoramically, instead of withdrawing each, and leaving a white disc while the next picture is inserted. The new triple condenser, designed by Mr. J. Traill Taylor, is also being made by Mr. Newton & Co.

Messrs. Butcher & Son, of Blackheath, London, S.E., have added a lantern department to their business of manufacturing chemists, and among other apparatus we find a new form of instrument for viewing or inspecting lantern slides. This instrument which they term "Reflectoscope," has a substantial appearance as shown in the illustration. The lantern slides are passed through the horizontal slot at the side, and viewed at a 3¼ inch magnifying glass at the upper part. A reflector is placed in the lower part of instrument, at an angle to reflect the light through the slide, which is then seen in a mirror placed opposite the magnifying lens.



Flying Carrier. This carrier is something entirely different from existing carriers—with it the changes of slides are very rapid, as a tape acts as a multiplying gear. The slides are inserted at the extreme ends of the carrier. It works with ease and certainty, and appears to be meeting with great favour.


LEVIATHAN

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Editorial Table.

Labels.—We have receive from Messrs. Percy Lund & Co., a neat and useful book of labels, for photographic and other purposes. The labels are perforated and gummed, whilst the front is protected by a varnish, which prevents them becoming detached from the bottle, by reason of solutions dribbling over them. Another special feature in connection with these labels, is that in all cases of poison, the antidote is printed immediately below the name. The complete book only costs 6d.

"Maxotints" is a name given by Mr. D. McNae, for a process of colouring photographic prints with aniline tints. We have no particulars of this process, which Mr. McNae informs us he intends to keep secret, but the samples we have seen are quite as good as those done by the ordinary published processes. There may, however, be some easy method of applying these colours, but of this we do not know.

American Catalogue.—We have received from The McIntosh Optical Co., of 141, Wabash Avenue, Chicago, U.S.A., the catalogue which, according to their advertisement on page xvii., they invite our readers to send for. This catalogue, which contains upwards of 300 pages, is beautifully got up, and is full of cuts of lantern apparatus, the shapes of which are entirely different to what we are accustomed to see in this country. We observe that the jets are much shorter in the tubes than English ones. Not only is this catalogue a price list, but it contains a large store of valuable information in connection with optical projection. Slides of all kinds are described, including a very large selection of scientific slides.

Cadett Plates.—The makers of these plates have sent us some of their extra sensitive plates, and also a supply of lantern plates, but as these came rather late to report on in this issue, we hope to do so in our next number.

Lawson Saturator.—In our May issue we gave an illustration of a new saturator, invented by Mr. Lawson, Newton Le Willows, Lancashire. Since that time, many improvements have been made in the general shape of the instrument, which possesses great advantages. We have received from the inventor, one of their saturators, which we have tried, both in public, as well as private, and must say that we are particularly well pleased with its behaviour, and anticipate using it on numerous occasions this season. The saturator holds about 3 ozs. of benzoline, and goes bodily into the lantern (it being about the same size as the old fashion lantern Argand lamp). The tube from the oxygen bottle, is merely attached, and the light applied. The nipple, and lime holder, form part and parcel of the saturator—it is thus very compact. The light produced is exceedingly brilliant.

:o:

Correspondence.

ELECTRIC LIGHT FOR LANTERNS.

[*To the Editor.*]

Sir,—I notice an article on "The electric light for lanterns," by Searchlight, in the October number of Journal. The writer very evidently does *not* understand what he is trying to write about. He names three methods of generating electricity, and in the second method he names "dynamos, or *frictional* machines," what does this imply? As in the building of dynamos, the friction is reduced to a minimum, does the writer refer to the plate glass electrical machine? Because it is fearfully absurd and ignorant of the writer to mention such a machine in connection with electric lighting. Further on he says "The electricity generated from Grove's cells, if all could be utilized, would represent about 2 volts for each pound of zinc consumed." This is another grand display of "a little knowledge is a dangerous thing." The Grove's cell gives about 2 volts electro-motive-force, whether it be a *gill* one, or a *gallon*, the E. M. F. is the same, but the quantity is proportional to the surface, exposed to the charge.—Yours, &c., CARLO DONATI.

TRANSPARENT SCREENS.

[*To the Editor.*]

Dear Sir,—It is very gratifying to me to know that my paper on oil lamps and transparent screens, published in your August number, has received so many endorsements. I have a pile of correspondence on the subject from all parts of the world, and it may be equally gratifying to you to have proof of the large circulation of your little paper. The screen may be made of tracing paper, which can easily be obtained in rolls 3 ft. 6 in. wide, or in sheets, and it ought not to require much constructive skill to devise a method of supporting such a sheet of paper. I have said all I can in these columns, but those who do not care for the trouble of making the thing for themselves, I would refer them to the advertising pages.

Manchester. W. I. CHADWICK.

CARELESS PACKING OF GOODS.

[*To the Editor.*]

SIR,—The season has now approached when many Exhibitions are taking place throughout the country, and manufacturers of specialities, are requested to exhibit some of their latest goods. A great deal is usually promised by the person applying as to the care that will be exercised in showing the articles, and returning same, but my experience is a sorry one, for if the goods have been fairly handled (I say nothing of soiling), the repacking is simply vile, possibly left to some person, who never packed a box in their lives. Polished goods sent in tissue paper will be returned bare, a burnisher tumbling about with mahogany cameras, and such like idiotcy. Perhaps others have experienced the same kind of thing, and, like myself, almost vow not to exhibit again. If secretaries of societies and others, desire to show the goods of manufacturers, and there is constantly an incentive on both sides to be up to date, the least that can be done in common justice to the exhibitor, is to see personally that goods are properly and sensibly packed, so that no loss or quibble arises in a mutual arrangement.—Yours truly, WILLIAM TYLAR.

57, High Street, Aston, Birmingham.

—:o:—

Notes and Queries.

Geo. Andrews writes: "Some time ago at a lecture, I heard the assertion made that a photograph could be taken without a lens. Is this possible, and if so, what kind of apparatus or camera is required? I know very little of photography, only having just taken it up through reading your descriptions of different hand cameras, and eventually purchased——, which I like very well. *Answer.*—Yes, a photograph can be taken without a lens, by making a pin-hole in a piece of cardboard, and placing it on a camera, where the lens usually is. The distance of the sensitive plate from the lens, is of no consequence as regards sharpness, but the size of the picture is determined by the distance between them. A long exposure must be given.

Jet asks "What is the use of a lime moving up and down, in addition to being turned round by the thumb screw at back of limelight jet? *Reply.*—By the time the lime was turned completely round, the same spot would be presented to the stream of gas. This portion having been previously acted upon by the gas, would be pitted, and perhaps cause the flame to be deflected towards the condenser, and thus cause it to crack. By the lime rising at the same time it is being turned, the same spot cannot be submitted twice to the action of the gas; that is of course presuming that the thumb screw is always turned in the same direction.

R. B.—Soft limes for blow through, and hard limes for mixed jet.

J. Benjamen.—Hang a coloured or fancy cloth around your lantern stand, and you can get as much "finish" as you like. We do not understand your difficulty.

Arthur Broadwood writes: "I have an achromatic object glass, it is composed of two lenses which are stuck together with some kind of transparent glue, the lens has one flat side, and one rounded side. What is the shape of these glasses, and of what sort of glass are they made?" *Answer.*—The lens as a whole would be termed plano-convex, and composed of a double convex lens of crown glass, cemented by means of Canada Balsam, to a plano-concave lens, of flint glass.

C.—We do not understand what you mean by "lantern flaps," possibly you may mean the doors, if so, cannot you see the light through a piece of coloured glass?

Gas writes: "Can you oblige me through notes and queries column, by saying whether in a blow-through jet, pure hydrogen gives a better light than house gas, and if the difference is worth while the trouble in making?" *Answer.*—Pure hydrogen gives perhaps a little better light, but we question whether it is worth the trouble, especially if you have house gas at command.

Mixed in a Fix says: "I have always understood that a better light could be obtained with a mixed jet, than with a blow-through. I have been used to the latter, and have just bought a mixed jet from ——, but I cannot get so good a light as I had before." *Reply.*—In the hands of an experienced person, the mixed gives better light. Very few people, when using the mixed jet for the first time, manage to get the best light obtainable for the jet. A jet is an article that must be understood and humored according to wants. A person of experience can nearly always get a better light, from a particular mixed jet, that he is used to, than from a strange one. Patience and practice will soon put you right.

Reader.—We have read the first number, but would rather not express an opinion.

Jos. Tyson, Jun.—Try the effect of slightly unscrewing (and thus separating) the two lenses, of which the condenser is composed.

Subscriber writes: "On page XVII. of your advertisement pages, of the October Journal, there is an advertisement of an American firm with a large triple lantern. I observe from it that the maker places the condensers outside of the lantern, instead of inside, as in this country. Can you tell me why it is so?" *Answer.*—We presume it is mainly to enable the body of lantern to be made smaller than would have been the case if the wooden body had been carried to outside of condenser.

Enquirers re "Practical Hints," mentioned by Mr. D. W. Noakes, can obtain a copy free, from Messrs. D. W. Noakes & Son, of Greenwich.

H. H.—We forwarded as desired.

R. S. (Tarkastad, South Africa).—As your letter mainly refered to the transparent screen, spoken of in Mr. Chadwick's article in August number, we forwarded it to that gentleman, who has sent particulars (See page 146). The lamp you speak of is good.

Amo.—1, Dead black varnish may be made with gas or vegetable black, and French polish. 2, From the particulars you send, we think that there must be a leak near the chamber of the jet, and the hissing may arise from a slight obstruction in the jet. Make sure that the collar is screwed down tight. 3, The clicking noise in regulator is not unusual.

T. W. S.—We would advise that you try the oil lantern, before purchasing it.

One in doubt asks, how he can ascertain whether a cylinder contains oxygen or hydrogen? *Answer.*—In the absence of special apparatus, used for this purpose, fill a bladder from the cylinder, attach a piece of metal, squeeze, and apply a light. If the gas burns with a flame, it is hydrogen. If it greatly increases the intensity of the applied flame, it is oxygen.

Inquirer.—We cannot recommend any particular maker of limes. See our advertising column.

Would be Lecturer.—We do not know where you can obtain slides re "Time and Timekeepers," "Gems and precious stones," and "History of Silversmithing,"

Cylinder.—Cylinders can be sent to you in India, and can be shipped by Townsend Bros., 101, Leadenhall Street, E.C.

Enquirer (Abroad).—Particulars will be found in this issue.

Albo-Carbon.—Not for a disc the size you mention. Try a hot air saturator.